AMTree: an active approach to multicasting in mobile networks

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↑ ABSTRACT

Active networks (ANs) are a new paradigm in computer networking. In ANs, programs can be injected into routers and switches to extend the functionalities of the network. This allows programmers to enhance existing protocols and enables the rapid deploymentof new protocols. Little work has been done in the area of multicast routing in heterogeneous environments. In this paper, we propose AMTree, an AN-based multicast tree that is bidirectional, optimizable on demand and adaptive to source migration. We show how ANs can be exploited to enable multicast tree to be modified and optimized efficiently. By filtering unnecessary signaling messages, maintaining minimal storage at routers and incorporating features from shared-tree methods we are able to achieve a scalable solution. Furthermore, we introduce an AN-based optimisation algorithm that is executed on demand by receivers. Besides that we introduce a fast rejoin protocol for receiver migration that makes no assumptions about the existence of multicast services in foreign networks. The performance of AMTree is compared to those of the bidirectional home agent (HA) method and the remote subscription method. We found that compared to the bidirectional HA method AMTree has a much lower handoff and end-to-end latency. Unlike the bidirectional HA method where end-to-end latency increases as the mobile host (MH) migrates further away from its HA, AMTree's latency remains fairly constant. We found that after optimization, the resulting tree's end-to-end latency to be comparable to the remote subscription method but without the need for building a new multicast tree after each handoff.

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